

LID & MS4 Stormwater Permit Nexus

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LID Basics and Beyond: Low Impact Development in the Arid Southwest

***Glendale Public Library
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- LID What: Introduction/Terms
- LID Why: Arid & Urban Challenges
- LID How: BMP strategy
- LID Benefits
- MS4 Stormwater Permit Requirements & how LID can help
- Evaluate Constraints for LID BMPs
- Steps 2 LID for MS4s
- MS4 Pre-project Assessment
- Summary
- Questions

What is LID: A site-specific, stormwater control strategy designed to minimize the detrimental effect of hydro-modification (unnatural directing of stormwater) due to development using a set of site-specific decentralized, small-scale controls integrated into a site's landscape features.

MS4: a Municipal Separate Storm Sewer System owned/operated by a County, City or Town or other public body that discharges to surface waters of the U.S. *40 CFR 122.26(b)(4), (b)(7), & (b)(8)*

LID Goal: To remove pollutants close to its source through infiltration, filtering, storing, evaporating, and detaining runoff in a way that mimics pre-development conditions, using a series of small-scale site integrated BMPs, designed to be a site-specific comprehensive stormwater management and control system.

Also, to see stormwater as a commodity to be conserved and utilized on-site and not just a waste product that is conveyed for disposal.

Why LID is important to us?

The challenges we face

Arid Environment & unique conditions: rainfall depths are much lower, evaporation rates much higher, pollutant concentrations in stormwater much higher, sparse vegetative cover, sediment movement much greater, dry weather flow is rare

Urbanization: heat island effect, high surface water temp., limited open space, impervious surface % high, stormwater runoff generation high, lack of shade & vegetation, poor air quality.

Think: Stormwater is a commodity to be conserved instead of a waste product to be disposed of.

- Disconnect impervious surfaces
- Move from centralized to site level stormwater control & management
- Limit centralized control to the overflow from large storm events (flood control)
- Increase % porous pavement, add curb cuts
- Remove/replace impervious surface & limit % allowed in future
- Replace non-native plants with low-input native varieties
- ***With BMPs!***

Best Management Practices (BMPs): two types

1) Non-Structural:

- Land-use ordinances & practices
- Education
- Comprehensive site planning
- Pre-application meeting requirements for LID elements
- LID BMP tracking/GIS system

2) Structural:

- Bioretention, swales
- Flow-through planters & tree boxes
- Porous pavement & curb cuts
- Water harvesting (rain barrels, cisterns)
- Eco-roofs
- Low-input landscaping, rain gardens
- Vegetated buffers

Environmental

- Cost Effective - less treatment, less conveyance, less maintenance, less fines, etc.
- Mitigates downstream flooding, erosion and aggradation
- Helps control water quality
- Preserves stream base for riparian ecosystems
- Helps recharge groundwater
- Preserves natural temperatures in receiving waters
- Multifunctional: landscaping, aesthetics, native vegetation, social benefits, open space use, etc.
- Resilient and adaptable to various climates

Functional

- Treats first flush runoff
 - Majority of contaminants
- Treats common small/medium-size storm
 - Majority of storms
- Design includes overflow for large storms
 - Conventional MS4 used as back-up
- Aesthetically pleasing
- Easy to maintain

Functional cont.

- MS4 will see less flow volume/ sediment to storm sewer system
- MS4 lower maintenance requirements to curb & gutter system
- MS4 may require less personnel/capitol equipment in long-term

Good for the Environment & Good for the MS4!

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Which MS4 stormwater requirements can the use of LID design, strategy, and practices help to satisfy?

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Title 40: Protection of Environment

PART 122.26—EPA ADMINISTERED PERMIT PROGRAMS: THE NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM

Subpart B—Permit Application and Special NPDES Program Requirements

How LID can help the MS4 meet permit requirements:

Public Education & Outreach on Stormwater Impacts: 40 CFR 122.34(b)(1)

- Municipalities can post signs describing the functions & benefits of LID BMPs, including information about the impacts of urbanization on water resources.

Public Involvement & Participation:

40 CFR 122.34(b)(2)

- Municipalities can encourage citizens and community groups to get involved in stormwater management by implementing rain gardens & other BMPs at their homes & businesses
- Municipalities can sponsor workshops & demonstrations of environmentally friendly landscaping, such as rainwater harvesting techniques and reuse, and the proper selection of native plants.

Construction Site Stormwater Runoff:

40 CFR 122.34(b)(4)

- Preservation of open space reduces the amount of area cleared & graded, and decreasing costs for erosion & sediment control.
- Municipalities can include this practice as one of their required or recommended BMPs for developers and can incorporate this practice into capital improvement projects

Post-Construction Stormwater Management in New Development & Redevelopment:

40 CFR 122.26(d)(2)(iv)(A)(2), 40 CFR 122.34(b)(5)(i)

- All stormwater permits require post construction stormwater management controls which can include both structural & non-structural practices . An adequate legal authority must also be adopted (typically ordinances/codes) to address these discharges as well as a way to ensure long-term maintenance of the control measures.
- LID practices have been shown to remove pollutants and sediment, are highly effective at maintaining or restoring a site's hydrology, and have been shown to require little long-term maintenance when compared to curb & gutter systems

Pollution Prevention/Good Housekeeping for Municipal Operations: *40 CFR 122.34(b)(6)*

- The use of native plants in landscaping reduces the need for municipal crews to irrigate or use pesticides, herbicides or fertilizers.
- Municipalities can incorporate selection of native plants into its landscaping guidelines and can train its maintenance crews to use integrated pest management.
- Institute BMP maintenance tracking/GIS system w/ LID specific layer

Site-specific reasons to limit LID use:

- Shallow groundwater
- Inability to percolate stormwater
- DUER or known soil contamination exists for site or immediately up-gradient
- Other probable contamination due to historical activities
- BMP(s) identified not sufficient for site-specific conditions

Ways an MS4 can encourage LID within the jurisdiction or make LID standard practice

- Update development standards and pass ordinances with LID requirements and/or incentives for use
- Require LID for Capital Improvement Projects
- Educate developers and maintenance crews
- Quantify the benefits of LID w/ maintenance tracking system
- Publish local LID use guidance manual for developers

Key items an MS4 may want to require through ordinance or other mechanism:

- Engineering/Construction checklists to include known issues for LID constraint
- Require percolation test (Double ring infiltration)
- Require site check for known/likely soil contamination /historical activities & immediately up-gradient sites
- Require soil report with application

- LID strategy is designed to control stormwater at the site level, mimic predevelopment hydrology through a series of decentralized planned BMPs
- Sustainable LID projects are site-specific & only as good as the system's design
- LID must be planned at the project's front-end and not as an after thought
- LID can satisfy some MS4 stormwater permit requirements

- MS4s help to create sustainable urban environments through support for and use of LID strategy & practices for new development & redevelopment within its jurisdiction

More information and references:

- **U.S. Environmental Protection Agency**
LID publications
www.epa.gov/owow/nps/lid
- **Low Impact Development Center**
LID tools, research, training, program development, design
www.lowimpactdevelopment.org

Questions?

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